

Astrophysics and Geophysics

OPTICAL PHOTOMETRIC MONITORING OF GAMMA-RAY BRIGHT BL LACERTAE OBJECTS

Lindsay E. Hopper, Michael T. Carini* & Wesley T. Ryle

Western Kentucky University
Department of Physics and Astronomy
1 Big Red Way
Bowling Green, KY 42101
lindsay@twincreeksfarm.org

BL Lacertae objects are the most extreme members of a class of objects known as Active Galactic Nuclei. Most models of the AGN phenomena involve a central, supermassive black hole, surrounded by an accretion disk. Perpendicular to the accretion disk are two jets of material, and the type of source we see depends on the angle the jet makes with the line of sight and the strength of the jet itself. In the case of BL Lac objects, the jets are aligned with the line of sight, and the radiation is being beamed directly at us. The defining characteristics of BL Lac objects are large amplitude continuum variability at all wavelengths, a featureless optical continuum, and large amplitude, highly variable polarization. Variations on the timescale of hours are known as microvariability, and represent the fastest variations observed in these sources and thus (via light travel time arguments) provide the tightest constraints on the size of the emission region. Using the 0.6m telescope at the Bell Observatory of Western Kentucky University we obtained observations of BL Lacertae in B and I filters to 1) set limits to the size of the emission regions responsible for any observed microvariability and 2) test models of the jet physics and of the origin of the seed photons responsible for the observed gamma-ray emission..